

City of Flagstaff

2004 Report to the Consumer on Water Quality

January 1, 2003 – December 31, 2003

Este informe contiene información muy importante sobre su agua beber.
Tradúzcalo ó hable con alguien que lo entienda bien.

Díí kwe'é naaltsoos
hasht'eelyaayíí 'éí nit haz'ánigi tó
baa 'áháyáá dóó yá'át'ééh
óolzinigíí yaa hahné'.

Doo bik'i'dinitjhgóó da, t'áá háida ta' níká'doolwot dóó
hazhó'ó yee nit ch'ihodoo'áát.



Surface waters depend on deep winter snow pack
and a good spring run-off.
Summer rains have little impact on increasing
surface water supplies.

Dear Water Consumer,

As Northern Arizona continues to experience the effects of a lingering drought, several milestones were achieved this past year to ensure a safe, reliable and sustainable drinking water supply for Flagstaff's future.

Recognizing that our water resources are valuable the City Council amended the existing water conservation ordinance and adopted an innovative water resource resolution. The resolution implements a long-term sustainability strategy; encouraging water use efficiency and increasing community reclaim water use. It also established a Water Conservation Coordinator position. Adam Miller was appointed to administer the program initiatives, which promote water awareness, education and appreciation of our valuable resource.

The City's Water Conservation Program received the 2003



**"Governors Pride
In Arizona Award"**
for Distinguished
Community
Achievement. This
award belongs to
the community. It is
a result of many
long meetings
involving the public
input that have gone
into developing our program.



During 2003 we completed and brought on-line several new water production facilities. Last May, the Filtration Building was dedicated at the Lake Mary Water Treatment Plant. In the fall, two local well sites and a water standpipe were equipped and are now providing clear, clean water of exceptional quality to Flagstaff.

As we enter a new year our efforts are continuing to increase water reuse opportunities and locate additional water resources. This spring a bond proposal will go before the citizens of Flagstaff that may help these efforts.

The May 2004 Bond Election will ask voters to approve funding for new water wells, the authority to sell bonds for future water acquisition and provide for upgrades at the Wildcat Hill WWTP. Improvements to this facility will raise the reuse water quality to an A+ reclaim standard and allow connection to the Rio de Flag reclaim system.

Your water utility continues to strive for excellence through self-evaluation; we are currently involved in a department assessment with the American Water Works Association (AWWA) Qual Serve program. This peer review will identify our strengths and specific areas where we can improve...to better serve you.

I am pleased to present you the 2003 City of Flagstaff *Report to the Consumer on Water Quality*. This annual report outlines where your drinking water comes from, how it is treated, and the results of tests performed on the quality of Flagstaff drinking water. Additionally, as mandated by the U.S. Environmental Protection Agency, this report informs you of contaminant levels in your drinking water, as well as violations incurred last year, among other important health information.

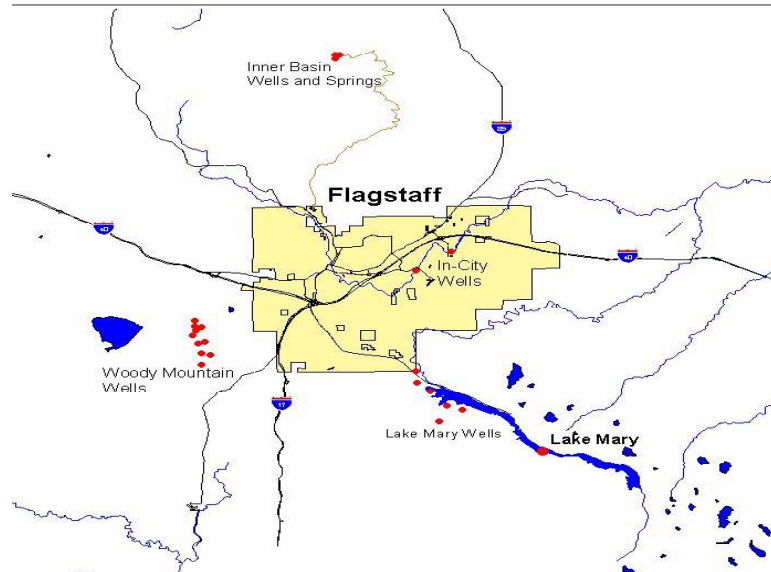
Thank you, for all your efforts to support wise and efficient water use in Flagstaff during these periods of dry weather.

Ron Doba
Director, Utilities Department

Water Resources

In 2003 the Utilities Department distributed approximately 2.805 billion gallons of water to Flagstaff water customers. This is over a 2 % reduction from 2002 water use. The Department finds that conservation programs have been effective with reducing summer peak demands, and anticipates implementing additional water conservation programs in the future.

City Of Flagstaff Water Resources



The City of Flagstaff is supplied by surface water from Upper Lake Mary and the Inner Basin of the San Francisco Peaks. We also pump groundwater from the Woody Mountain Wellfield, Lake Mary Wellfield, and other Local Wells, which tap the Coconino and Supai Aquifers.

These sources blend in the water distribution system and the amount of water coming from each source varies throughout the year.



CITY OF FLAGSTAFF **2003** **WATER QUALITY TABLE**



What does the Following Table Mean?

The table shows the results of our water-quality analyses. Every regulated contaminant that we detected in the water, even in minute traces, is listed here. The Utilities Department conducted 3,293 tests for 117 contaminants in 2003.

The information in the following table only addresses detected contaminants. We have chosen not to report information for contaminants tested for and not detected. The table contains the name of each substance, the highest level allowed by regulation (**MCL**), the ideal goals for public health, the amount detected, the usual sources of such contamination, footnotes explaining our findings, and a key to units of measurement.

Definitions:

Maximum Contaminant Level (MCL): The highest level of a regulated contaminant that is allowed in drinking water. The MCL is set as close to the MCLG (see below) as feasible using the best available treatment technology. The MCL is set at very stringent standards.

To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having their health compromised.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. The MCLG allows for a margin of safety.

Action Level (AL): The concentration of a contaminant, which if exceeded, triggers treatment or other requirement that a water system must meet.

Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.

Key to Table:

AL= Action Level

MCL= Maximum Contaminant Level

MCLG= Maximum Contaminant Level Goal

NTU= Nephelometric Turbidity Units

P/A= Presence / Absence

pCi/l= Picocuries per liter (a measurement of radioactivity)

ppm= Parts per million, or milligrams per liter

ppb= Parts per billion, or micrograms per liter

TOC= Total Organic Carbon

< = Less than

> = Greater than

Contaminant	Date Tested	Unit	MCL	MCLG	Highest Detected Amount*	Range	Major Sources	Violation
Arsenic	5/02/03	ppb	50 ¹	None	5.6	1.1-5.6	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production waste.	NO
Barium	10/28/03	ppm	2	2	0.91	0.007-0.91	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	NO
Chromium	10/28/03	ppb	100	100	2.7	<0.1 - 2.7	Discharge from steel and pulp mills; erosion of natural deposits	NO
Fluoride	6/24/03	ppm	4.0	4.0	0.21	0.06 – 0.21	Erosion from natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories	NO
Nitrate	5/20/03	ppm	10	10	1.4	<0.1 – 1.4	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural	NO

Nitrite	5/50/03	ppm	1	1	<0.1	<0.1	deposits Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	NO
Sodium	5/20/03	ppm	N/A	N/A	7.7	2.8 – 7.7	Natural erosion	NO
Sulfate	5/21/03	ppm	N/A	N/A	10	2.1 - 10	Natural erosion; industrial wastes; water treatment chemical	NO

Maximum Residual Disinfection Level (MRDL)²

Chlorine Residual, Free	Weekly	ppm	4.0	NA	1.42	0.01 – 1.42	Chlorine disinfectant added during the water treatment process	NO
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Microbiological Contaminants

Combined Filter Turbidity ³	Every 4 hrs	NTU	1 ⁴	N/A	0.3	0.01 – 0.03	Soil runoff	NO
Combined Filter Turbidity ³	Every 4 hrs	NTU	0.3 ⁵	N/A	0.3	0.01 – 0.3	Soil runoff	NO
Individual Filter Turbidity ³	Continual	NTU	1 ⁶	N/A	0.3	0.04 – 0.3	Soil runoff	YES⁶
Individual Filter Turbidity ³	Continual	NTU	0.5 ⁷	N/A	0.3	0.04 – 0.3	Soil runoff	YES⁷
Total Coliform (including fecal coliform and <i>E. coli</i>)	60 samples per month	P/A	<5% ⁸	Zero	2.9	0-2.9	Naturally present in the environment; fecal coliforms and <i>E. coli</i> come from human and animal fecal waste	NO

Disinfection Byproducts

TTHMs ⁹ (total trihalomethane)	Quarterly	ppb	80	NA ^{10, 11}	31.8	<0.5 – 31.8	By-product of drinking water chlorination.	NO
HAA5 ⁹ (total haloacetic acids)	Quarterly	ppb	60	NA ^{10, 11}	33.6	<1 – 33.6	By-product of drinking water chlorination	NO

Disinfection Byproduct Precursors

Percent ¹² TOC Removal	Monthly	%	50	NA	47.1 Least Removed	47.1 – 83.2	Decomposing plant material	YES¹²
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Radiochemicals

Gross Alpha	Varied 2003	pCi/L	15	Zero	3.2	<0.9 – 3.2	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known and alpha radiation	NO
Combined	Varied	pCi/L	5	Zero	2.1	<0.3 –	Erosion of natural	NO

Water Quality Table Endnotes:

- 1) The current EPA standard for arsenic in drinking water is 50 ppb. Effective 2006 this standard will be lowered to 10 ppb.
 - 2) Compliance with the Maximum Residual Disinfectant Level MCL (4.0 ppm) is based upon the running annual average of the monthly averages of all free chlorine residual tests performed at the same times and locations when samples are collected for total coliform analysis. The running annual average for the Year 2003 is 0.64 ppm.
 - 3) Turbidity is a measurement of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our surface water filtration system and an indicator of the absence of microbiological contamination.
 - 4) 100% of the time.
 - 5) 95% of the time.
 - 6) In two consecutive measurements taken 15 minutes apart. (From March through May, continual problems with the computerized turbidity monitoring system in the new Filtration Building at the Lake Mary Water Plant resulted in no electronic data collection. Hand written data was marginal. In August and again in September, problems occurred during computer maintenance that resulted in the loss of individual filter turbidity records. There were no hand written records as back-up. These problems resulted in Individual Filter Monitoring Violations for the months from March through May, August, and September).
 - 7) In two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous operation after the filter has been backwashed, or otherwise taken off-line. (From March through May, continual problems with the computerized turbidity monitoring system in the new Filtration Building at the Lake Mary Water Plant resulted in no electronic data collection. Hand written data was marginal. In August and again in September, problems occurred during computer maintenance that resulted in the loss of individual filter turbidity records. There were no hand written records as back-up. These problems resulted in Individual Filter Monitoring Violations for the months from March through May, August, and September).
 - 8) No more than 5% of samples may be total coliform positive in a month. Every sample that has total coliforms must be analyzed for either *E. coli* or fecal coliforms to determine whether human or animal fecal matter is present (fecal coliforms and *E. coli* are part of the total coliform group). There may not be any fecal coliforms or *E. coli*. Any confirmed fecal coliform or *E. coli* analysis results in a violation.
 - 9) Compliance with TTHMs and HAA5 is based on a running annual average. The running annual average as of the 4th quarter of 2003 was 14.0 ppb for TTHMs, and 11.9 ppb for HAA5.
 - 10) Although there is no collective MCLG for this group, there are individual MCLG's for some of the individual contaminants:
 - Haloacetic Acids: dichloroacetic acid (zero); trichloroacetic acid (0.3mg/L)
 - Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L)
 - 11) MCLG's were not established before the 1986 Amendments to the Safe Drinking Water Act. The standard for this contaminant was set prior to 1986. Therefore, there is no MCLG for this contaminant.
 - 12) Treatment technique for the control of disinfection byproduct precursors. A minimum of one sample per month must be collected whenever surface water is being treated. The required removal for Lake Mary water is 50% based upon an Alkalinity of 60 ppm or less and a Total Organic Carbon content of 8 ppm or greater. A monitoring violation occurred in April when the required sample was not collected. Compliance with removal requirements is based upon a running annual average of monthly removal ratios. The running annual average for 2003 was 1.22. A removal ratio less than 1 is a violation. (Removal ratio = % TOC removed / % TOC reduction requirement).
- * This column shows the results of tests on our finished water.

Other Contaminants

Radiochemicals – For the purpose of developing historical data, and in anticipation of future regulations, all points of entry (POE's) were monitored for Radiochemicals; Radium 226, Radium 228, Gross Alpha and Uranium during 2002. The detected amount is below the level that is being considered for their respective maximum contaminant levels (MCL's).

In 2003, the Utilities Department incurred monitoring violations for inadequate monitoring of individual filter turbidity and the lack of turbidity data storage. The violations occurred from March through May, August, and September.

The violations occurred as a result of computer problems associated with individual filter turbidity monitoring during the start-up process of the new Filter Building at the Lake Mary Water Plant.

The problems have been worked out and automatic turbidity monitoring has been working well. No turbidity limits were exceeded as determined by manual monitoring. Turbidity is a measurement of water clarity and is continually monitored as an indicator of other potential contaminants such as bacteria and protozoa.

We are also required to test for Total Organic Carbon (TOC) removal. The required removal for Lake Mary water is 50% based upon an Alkalinity of 60 ppm or less and a TOC content of 8 ppm or greater. A monitoring violation occurred in April when the required sample was not collected.

Our surface waters have low susceptibility for bacteria and protozoa, as there is little to no industrial, agricultural or domestic waste disposal into our surface waters. The possible health effects, of bacteria and protozoa contamination include nausea, diarrhea and vomiting.

It is the obligation of the Utilities Department to provide a safe and adequate supply of drinking water. To help please our customers and meet our obligation, the Utilities Department strongly encourages public input and community participation on decisions affecting your water resources.

Regular Water Commission meetings are held the third Thursday of each month. Meeting locations are posted on the official City bulletin board at City Hall. Meetings begin at 4:00 PM and you are always welcome.

Copies of this report are available at the Utilities Administration Office, City Hall 211 West Aspen Avenue, Flagstaff, AZ 86001, or on our web-site at www.flagstaff.az.gov. I hope this report provides you with valuable information about your drinking water that is easy to understand. We hope the results found in this report confirm that you can count on the City of Flagstaff for quality at the tap.

Additional Health Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791) or on the web at www.epa.gov/safewater.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons, such as those with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS, or other immune system disorders. Some elderly and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care provider.

EPA and Center for Disease Control guidelines, on appropriate means to lessen the risk of infection by Cryptosporidium, are available from the Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

Microbial Contaminants: Viruses, bacteria, and protozoan, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife. Microbial contaminants can cause short-term effects such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with compromised immune systems.

Inorganic Contaminants: Salts and metals, which can be naturally occurring or result from urban storm runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming. Certain inorganic contaminants consumed at levels in excess of the required MCL may result in skin damage, circulatory problems, liver problems, kidney damage, and increased risk of cancer

Pesticides and Herbicides: Which may come from a variety of sources such as agriculture, storm-water runoff, and residential uses. Pesticides and Herbicides consumed at levels greater than the required MCL may result in increased risk of blood problem, reproductive difficulties, kidney and liver damage, and increased risk of cancer.

Synthetic and Volatile Organic Chemical Contaminants: Which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm-water runoff and septic systems.

Radioactive Contaminants: Which can be naturally occurring or be the result of oil and gas production and mining activities. Radioactive contaminants may result in an increased risk of getting cancer.

In order to ensure that tap water is safe to drink, the Environmental Protection Agency prescribes regulations, which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Revised Drinking Water Regulations

Arsenic – Arsenic is a naturally occurring mineral known to cause cancer in humans at high concentrations. Epidemiological studies conducted in other countries indicate that high concentration of arsenic in drinking water, at several hundreds of parts per billion, have been shown to cause cancer. However there is insufficient data and information about lower levels of arsenic in the drinking water.

Recently the EPA lowered their standard for arsenic in drinking water from 50 ppb to 10 ppb, effective 2006. While your drinking water meets EPA's new standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Haloacetic Acids -- Haloacetic acids are disinfection by-products that are formed when chlorine is used as the disinfectant. These compounds can increase the risk of cancer, and became regulated as of January 1, 2002 with a MCL of 0.060 mg/L.

Maximum Residual Disinfection Level (MRDL) – Regulations for Maximum Residual Disinfection Level set a maximum limit for the running annual average MRDL at 4.0mg/L for chlorine. The average of samples taken in 2002 was 0.7mg/L chlorine, suggesting we shouldn't anticipate difficulty complying with this regulation.

TOC Removal Requirements – Control of disinfection by-product precursors has brought new regulations governing TOC removal requirements. TOC removal is accomplished through enhanced coagulation or enhanced softening. New regulations require a 50% TOC removal when the raw water TOC concentration is >8mg/L and alkalinity is <60mg/L. Violation shall occur when the ratio of the amount of actual TOC removal divided by the required amount of TOC removal is <1. The annual average TOC removal ratio for the year 2002 was 1.28. The range was 1.11 – 1.53.

Turbidity – As of January 1, 2002 the MCL for Combined Filter effluent was reduced to 1 NTU from 5 NTU for 100% of samples. The requirement for 95% of samples was reduced from 0.5 NTU to 0.3 NTU. Additionally, as of January 1, 2002 the Individual Filter effluent shall not exceed 1 NTU in two consecutive measurements 15 minutes apart, and shall not exceed 0.5 NTU in two consecutive measurements 15 minutes apart after 4 hours of continuous operation.

Thank you for reading this important information on your water's quality. We'll be happy to answer your questions about the City of Flagstaff's water supply. Contact: Jack Rathjen, Water Production Supervisor (Lake Mary Water Treatment Plant) at (928) 774 - 0262, or find information about your water system on the City of Flagstaff website at www.flagstaff.az.gov.

Water quality data for community water systems throughout the United States is also available at www.waterdate.com.